

TROPICAL CORN OFFERS NEW OPTIONS FOR CONSERVATION-TILLAGE

Many growers hesitate to use winter annual legumes in rotation with summer crops, because the expense of reseeding and killing legumes can outweigh the value of the nitrogen (N) these plants supply. However, conservation tillage systems utilizing new tropical corn hybrids may increase the advantages of using winter annual legumes.

Tropical corn is planted in late spring (mid-May to mid-June), which gives the legume time to mature, maximize N fixation, reseed, die, and dry down. In addition, N released by the legume also may be better utilized by tropical corn than by temperate corn because of the late planting date of tropical corn. Tropical corn, therefore, could utilize a higher percentage of N from the legume. Additionally, practicing conservation-tillage would allow the legume to reseed.

Research at the AAES studied N management of three tropical corn hybrids (Dekalb 678C, Pioneer 304C, and Pioneer 3072) in a conservation-tillage system following reseeded crimson clover or winter fallow.

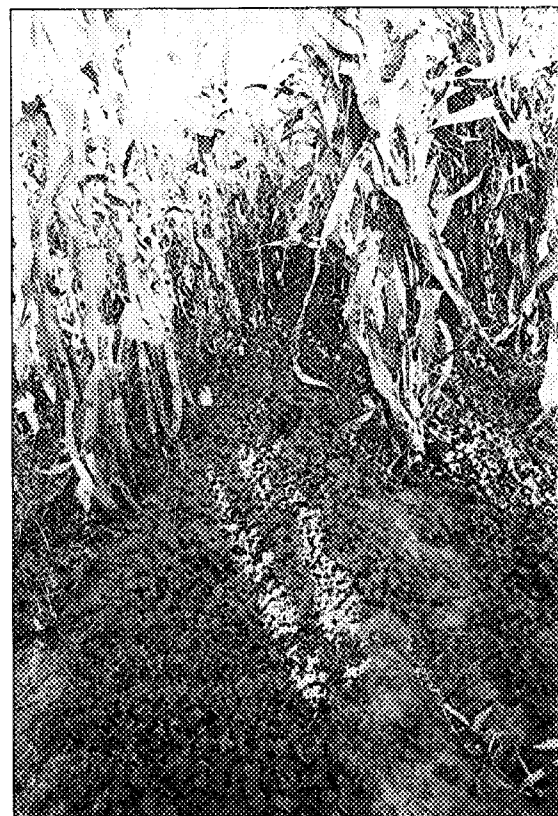
Nitrogen rates ranged from 0 to 180 lb. of N per acre. Tibbee crimson clover was seeded at the Sand Mountain Substation, Crossville, and at the E.V. Smith Research Center, Shorter, in October 1988. It has naturally reseeded every year since then. The rows were subsoiled, leaving clover residue in the row middles. Tropical corn hybrids were then planted into the residue.

Weather and insect problems affected yields at both locations during some years. However, the benefits provided by the clover mulch were evident in both grain and silage yields. Acceptable grain and silage yields were produced with as little as 45 lb. N per acre. In the fallow system, 180 lb. of N per acre were needed to produce a comparable yield.

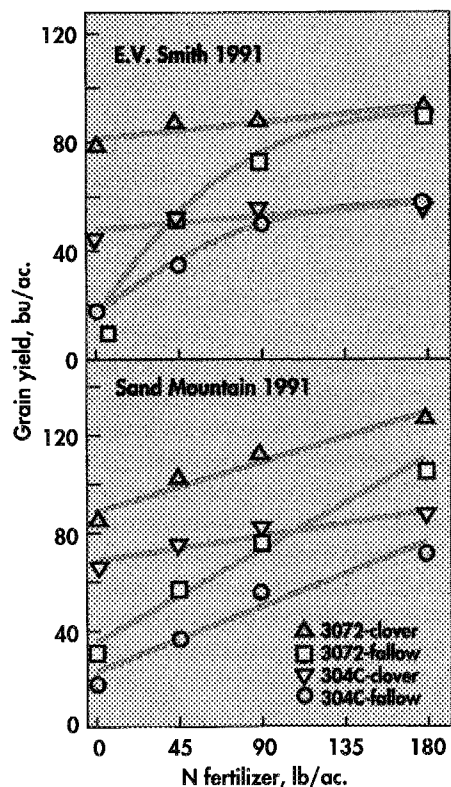
Severe drought and heavy infestations of fall armyworm caused crop failures at both locations in 1990. The only yield determined was for silage at Sand Mountain. The clover system increased silage yield 2.3 tons per acre (from 11.9 tons per acre following fallow to 14.2 tons per acre following clover). This higher yield was likely the result of improved soil moisture under the clover system.

In 1991, Pioneer hybrid 3072 replaced Dekalb hybrid 678C because it was identified as a top grain producer, while the other hybrids are better adapted for silage. Silage production for both hybrids was similar (25 tons at Sand Mountain and 19 tons at E.V. Smith), but Pioneer 3072 had a higher grain yield potential than 304C (see figure).

Reseeded crimson clover resulted in grain yield increases for both hybrids that ranged from 32 to 69%. The response of Pioneer hybrid 3072 to the cover crop was greater than that of Pioneer hybrid 304C. At both locations, 45 lb. of N per acre following



Crimson clover reseeds into tropical corn.



Grain yield response of tropical corn hybrids to applied N as affected by cover crop.

clover produced equivalent or greater grain yields than the 180 lb. of N per acre following fallow. Silage yield following clover was similar for both hybrids. Yield increased from 18.8 to 19.1 tons per acre at E.V. Smith and from 23.3 to 25.9 tons per acre at Sand Mountain when N rates were increased from 45 to 180 lb. per acre. Following winter fallow, however, silage production increased 35% at both sites when N fertilizer was increased from 45 to 180 lb. N per acre.

Although spring planted corn, when planted on time, generally yields better than tropical corn, it cannot fully utilize the benefits provided by winter annual legumes. Using tropical corn-clover systems, however, allows the initial seed cost of crimson clover (\$18 per acre) to be quickly offset by savings in N fertilizer. Improved soil moisture and reduced erosion are added benefits.

Kingery is Research Technician, USDA-ARS; Reeves is USDA-ARS Research Scientist and Adjunct Professor of Agronomy and Soils; Mask is Assistant Professor of Agronomy and Soils.